

3.1 International trade: Free trade

Learning Outcomes

- Explain that gains from trade include lower prices for consumers, greater choice for consumers, and the ability of producers to benefit from economies of scale, the ability to acquire needed resources, a more efficient allocation of resources, increased competition, and a source of foreign exchange.
- Describe the objectives and functions of the WTO.

Subject vocabulary

raw material the basic material from which a good is made

import goods sold into a country from another country

natural resources assets, such as mineral deposits and timber, that occur in nature and can be used in production

exports goods produced in one country that are sold into another country

consumer welfare a measure of the benefit obtained from the consumption of goods

economies of scale the cost advantages gained by a firm from increasing the scale of its production. Average cost falls in the long run as the size of a firm's operation increases.

specialized capital capital designed to perform a specific function

long-run average cost the cost per unit of output when all factors are variable

inputs the resources used to produce goods

real income income after taking into account the effects of inflation on purchasing power

closed economy an economy that is self-sufficient and does not trade with the rest of the world

market power the ability of a firm to change the market price of a good or service

X-inefficient a lack of technical and productive efficiency that exists in large firms

open economy an economy in which firms engage in the international exchange of goods and services

Glossary

trading buying/selling of large quantities of goods especially between countries

Model sentence: The benefits from trade include an increase in competition and economies of scale that lead to improvements in efficiency, lower prices, and more consumer choice. The sale of exports provides foreign exchange with which countries can buy resources it does not have.

Explain the gains from trade

Trade allows countries to buy resources they do not have. Each country has different amounts of resources. Some countries have oil, some have none. Therefore a country without oil can buy it from an oil-producing country. The same is true for many other goods such as certain food products and **raw materials**, such as copper used in the production of other goods. Regions of some countries such as Italy specialize in the production of wine because the climate is favourable, the land is productive, and there is a large workforce that has the necessary skills. Other countries such as the UK can make wine but at a higher cost per unit because its factors are not as productive at making wine. The UK produces other goods and services that its factors of production can produce efficiently, such as financial services.

Japan and the US for example produce lots of computers and other technologically advanced goods. Other countries do not have the resources to be able to produce such goods so they must **import** them. South Korea has very few **natural resources**. It **exports** a variety of manufactured goods thereby earning the money it needs to import the natural resources its industries need.

Model sentence: A country's exports are a source of foreign exchange. The country can use the money it receives from the sale of its exports to buy the imported resources it needs.

International trade leads to an increase in consumer choice. Because countries trade, consumers are able to buy different goods from all around the world, goods which they would not be able to consume if countries did not trade with each other. More wants can be satisfied, increasing **consumer welfare**.

Industries that export have a global mass market. An industry producing for a large market can benefit from **economies of scale**. For example, mass production techniques can be used, employing expensive technologically advanced, highly **specialized capital**. Such production methods greatly increase productivity and reduce **long-run average total cost**.

Countries can specialize in the production of particular goods that they can produce most efficiently with their resources. It can then export these goods and import other goods from countries specializing in the production of goods that they are most efficient at producing. By specializing and **trading** it is possible to maximize the world output of goods and services from a given quantity of resources: maximizing output from a fixed quantity of **inputs**. It is possible that each good can be produced at lowest possible average total cost. Therefore, in competitive markets prices are pushed down. Lower prices and increasing **real income** is therefore a gain from trade.

A domestic monopoly in a **closed economy** has **market power**. It can set price or limit supply to drive up prices and profit. Because of high profits it can be **X-inefficient**. Average total cost will be above the minimum. In an **open economy** the domestic industry has to compete with foreign industries. If the domestic industry is to survive it must make sure the quality of the product is good and improve productivity, thereby reducing average cost so that it can sell its goods at a competitive price.

Model sentence: All industries that are competing internationally in a free market have to be productively efficient in order to be price competitive if they are to stay in business. Therefore international trade leads to improvements in efficiency and lower prices.

What are the aims and functions of the World Trade Organization (WTO)?

The WTO's main objective is the promotion of global **trade liberalization**. This means that it encourages trading countries or trading blocks to remove or reduce barriers to trade, such as **tariffs** and **quotas** on imported goods and services, and subsidies given by a government to its domestic industries. It also promotes **anti-dumping legislation**. The WTO provides a **forum** for the governments of countries to negotiate the taking down of the barriers to free trade and it witnesses the signing of agreements. The WTO acts as a mediator or referee when arguments and disputes occur over the negotiated signed agreements. The WTO tries to settle the arguments between countries and ensure that the agreements are not broken. It acts as a 'court' to which countries can bring their complaints and disputes, and the WTO can make a judgement for or against a country.

Test your understanding of this unit by answering the following question

- Explain how international trade can increase productive efficiency and lower prices.

Subject vocabulary

trade liberalization the removal of or reduction in the international barriers to trade, such as tariffs and quotas

tariffs a tax placed on imported goods and services

quota a physical limit placed on the number of goods that can be traded or produced

anti-dumping legislation laws/regulations used to stop firms exporting goods to another country at a low price

Learning Outcomes

- Explain the theory of absolute advantage. (HL)
- Explain, using a diagram, the gains from trade arising from a country's absolute advantage in the production of a good. (HL)
- Explain the theory of comparative advantage. (HL)
- Describe the sources of comparative advantage, including the differences between countries in factor endowments and the levels of technology. (HL)
- Draw a diagram to show comparative advantage. (HL)
- Calculate opportunity costs from a set of data in order to identify comparative advantage. (HL)
- Draw a diagram to illustrate comparative advantage from a set of data. (HL)
- Discuss the real-world relevance and limitations of the theory of comparative advantage, considering factors including the assumptions on which it rests, and the costs and benefits of **specialization**. (HL)

Explain the theory of absolute advantage (HL)

A country has absolute advantage in the production of a good if it can produce the good using fewer **resources** than another country. In other words, a country has absolute advantage in the production of a good if output of the good from a given amount of resources is greater than in another country.

	Wine	Cheese
Country X	10	15
Country Y	20	10

Table 69.1

Table 69.1 shows two countries, X and Y. Each country has the same amount of resources. Each country produces wine and cheese. If country X uses its resources to produce wine it can produce 10 units of wine in a given time period and if it uses them to produce cheese it can produce 15 units of cheese in a given time period.

If country Y uses its resources to produce wine it can produce 20 units of wine and if it uses them to produce cheese it can produce 10 units of cheese. Country X has an absolute advantage in the production of cheese and country Y has absolute advantage in the production of wine.

If the countries do not specialize and trade they can produce a combination of wine and cheese with their resources as shown in Figures 69.1a and 69.1b (both on page 198). The production possibility curve shows all possible combinations of outputs of two goods when all resources are employed. Country X is using its resources to produce 6 units of cheese and 6 units of wine which is at point A on its PPC. Country Y is using its resources to produce 6 units of cheese and 8 units of wine which is at point B on its PPC.

If the two countries specialize the total output of goods produced using all the resources of both countries increases. It is now possible to produce 20 units of wine and 15 units of cheese. If the two countries specialize and trade it is possible for both countries to consume a greater quantity of both wine and cheese. It is possible for both countries to consume a combination of the two goods at a point that is outside their PPCs. For example, if the countries trade it is possible for country X to consume 7 units of cheese and 10 units of wine, which is at point A1, outside its PPC, and for country Y to consume 8 units of cheese and 10 units of wine, which is at point B1, outside its PPC.

Subject vocabulary

specialization the performing of specific tasks in the workplace

resources the inputs into the production process, the factors of production

Glossary

forum public meeting/debate opportunity

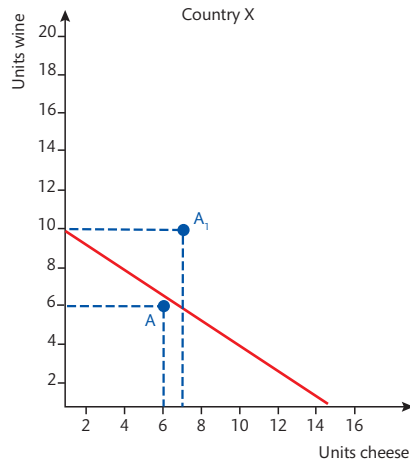


Figure 69.1a

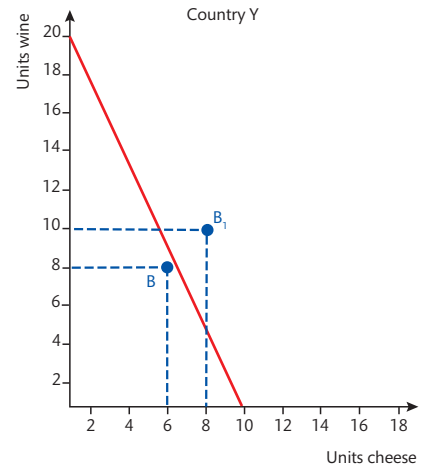


Figure 69.1b

Model sentence: With a fixed amount of resources total output can be increased and more wants can be satisfied when the two countries specialize in the production of the good in which they have an absolute advantage and then trade.

Explain the theory of comparative advantage (HL)

The theory of comparative advantage explains why it would be beneficial for both countries to trade even if one of the countries has an absolute advantage in the production of both goods.

A country has a comparative advantage in the production of a good when it can produce the good at a lower **opportunity cost** than another country. If a country is using all its resources and wants to produce an additional unit of a good it must transfer resources away from the production of the other good. The opportunity cost of producing an additional unit of one good is the quantity of the other good forgone (given up).

	Wine	Cheese
Country X	200	100
Country Y	600	150

Table 69.2

Table 69.2 shows the output of wine and cheese in two countries, X and Y. Country Y has an absolute advantage in the production of both goods.

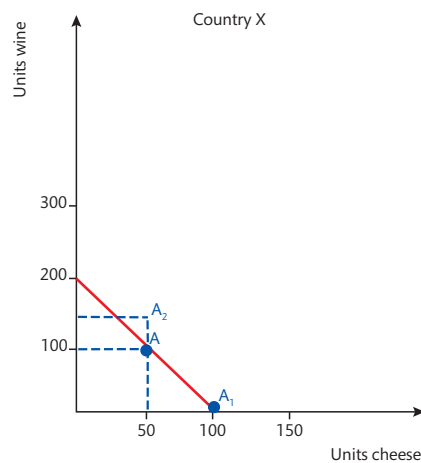


Figure 69.2a

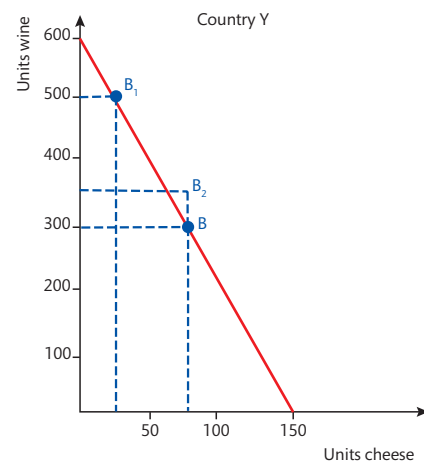


Figure 69.2b

Subject vocabulary

opportunity cost the next best alternative forgone

To show that both countries can benefit from specializing and then trading it is necessary to calculate the relative opportunity costs of production. The information in Table 69.2 is used to draw the production possibility curves for each country shown in Figures 69.2a and 69.2b. The PPC for each country shows the possible combinations of output of the two goods when all resources are employed.

What is the opportunity cost of a unit of wine in country X? – a step-by-step guide

Trouble shooter

If country X uses all its resources to produce wine it can produce 200 units of wine and 0 units of cheese.

If country X uses all its resources to produce cheese it can produce 100 units of cheese and 0 units of wine.

If country X wants to produce wine instead of cheese it must give up 100 units of cheese in order to produce 200 units of wine.

100 units of cheese must be given up in order to produce 200 units of wine.

The opportunity cost of 1 unit of wine = $\frac{100}{200} = \frac{1}{2} = \frac{1}{2}$ a unit of cheese.

What is the opportunity cost of cheese in country X?

If country X uses all its resources to produce cheese it can make 100 units of cheese and 0 units of wine.

If country X wants to produce cheese instead of wine it must give up 200 units of wine in order to produce 100 units of cheese. The opportunity cost of 1 unit of cheese = $\frac{200}{100} = \frac{2}{1} = 2$ units of wine.

What is the opportunity cost of a unit of wine in country Y?

If country Y uses all its resources to produce wine it can produce 600 units of wine and 0 units of cheese.

If country Y wants to produce wine instead of cheese it must give up 150 units of cheese in order to produce 600 units of wine. The opportunity cost of 1 unit of wine = $\frac{150}{600} = \frac{1}{4}$ of a unit of cheese.

What is the opportunity cost of a unit of cheese in country Y?

If country Y uses all its resources to produce cheese it can make 150 units of cheese and 0 units of wine.

If country Y wants to produce cheese instead of wine it must give up 600 units of wine in order to produce 150 units of cheese. The opportunity cost of 1 unit of cheese = $\frac{600}{150} = 4$ units of wine.

A country has a comparative advantage in the production of a good when it can produce the good at a lower opportunity cost than another country.

The opportunity cost of 1 unit of wine in country X is a $\frac{1}{2}$ unit of cheese.

The opportunity cost of 1 unit of wine in country Y is a $\frac{1}{4}$ unit of cheese.

Therefore, country Y has a comparative advantage in the production of wine.

The opportunity cost of 1 unit of cheese in country X is 2 units of wine.

The opportunity cost of 1 unit of cheese in country Y is 4 units of wine.

Therefore, country X has a comparative advantage in the production of cheese.

Using PPC diagrams, show what happens to total output and consumption if the two countries specialize

Total output from a given quantity of resources can be increased if countries specialize. Figures 69.2a and 69.2b show the production possibility curves for country X and country Y. The PPC for each country shows the possible combinations of output of the two goods when all resources are employed. The **slope** of the PPC shows the opportunity cost.

If country X uses half of its resources to produce wine and half to produce cheese it can produce 100 units of wine and 50 units of cheese, which is at point A on its PPC.

If country Y uses half of its resources to produce wine and half to produce cheese it can produce 300 units of wine and 75 units of cheese, which is at point B on its PPC.

Total output of country X and Y = 400 units of wine and 125 units of cheese.

Country X has a comparative advantage in the production of cheese and country Y has a comparative advantage in the production of wine. Country X specializes in the production of cheese at point A₁ on the PPC producing 100 units of cheese and 0 units of wine. Country Y specializes in the production of wine but wants to keep the combined output of cheese at 125 units. It produces 25 units of cheese and with its remaining resources is able to produce 500 units of wine, at point B₁ on its PPC.

Glossary

slope the angle/gradient of the curve

Total output of country X and country Y after specializing = 500 units of wine and 125 units of cheese.
Specializing leads to an increase in output of 100 units of wine.

If country X trades 50 units of cheese in exchange for 150 units of wine from country Y (an exchange rate of 1 unit of cheese for 3 units of wine) it is possible for both countries to consume a combination of the two goods at a point that is outside their PPCs. Country X is at point A_2 (150 units of wine and 50 units of cheese) and country Y is at point B_2 (350 units of wine and 75 units of cheese).

Subject vocabulary

resources the inputs into the production process, the factors of production

economic welfare the standard of living of people in an economy, often measured in terms of income per capita

factor endowment the amount of land, labour, capital, and entrepreneurship that a country has that can be used to produce goods and services

capital (goods) manufactured goods that are used in the production of other goods

costs of production the amount the firm pays for the factors of production used to produce goods or services

branded goods that have been given an identifiable mark, logo or label in order to distinguish them from substitutes

tariffs a tax placed on imported goods and services

quota a physical limit placed on the number of goods that can be traded or produced

Glossary

assumption(s) something thought/believed to be true but without proof

Explain why the countries should specialize and trade

If each country specializes in the production of the good in which it has a comparative advantage, it is possible to increase total output from the combined **resources** of both countries. Total output will be greater than if each country tried to be self-sufficient. There is an increase in output from a given quantity of resources thereby increasing economic welfare.

Model sentence: Specializing and trading allows countries to move to points outside their production possibility curves.

Model sentence: More goods are produced and consumed from a given quantity of resources if the two countries specialize in the production of goods in which they have a comparative advantage.

Model sentence: By specializing it is possible to increase the quantity of output from a given quantity of resources, thereby increasing **economic welfare**.

What are the sources of comparative advantage?

Factor endowment is an important source of comparative advantage. A country that has lots of productive farming land and a suitable climate will have a comparative advantage in the production of agricultural goods. For example, in parts of California in the US the land and climate are favourable for growing grapes; therefore, this region has a comparative advantage in the production of wine. The wine producers in this region also use technologically advanced **capital** thereby further reducing **costs of production**. A country that has many highly skilled engineers might have a comparative advantage in the production of technological goods. London has a comparative advantage in the production of financial services because there are many people there that have the necessary skills. A country that has lots of unskilled workers will have a comparative advantage in the production of basic manufactured goods. A country with lots of natural resources, such as natural gas and timber, has a comparative advantage in the supply of the resource.

Model sentence: If a country has a large quantity of a resource, such as timber, the labour with the necessary skills to exploit the resource, and technologically advanced capital to produce the good then the good can be produced at a relatively low average cost per unit.

Discuss the limitations of comparative advantage (HL)

The theory of comparative advantage is based on a number of **assumptions**. These assumptions cannot be applied to the real world of international trade thereby limiting the relevance and usefulness of the theory.

What are the assumptions of comparative advantage? – a step-by-step guide

Trouble shooter

No transport costs: Some countries have high transport costs when they specialize and trade. These countries may be worse off if they specialize because of the high costs of transporting the goods that they trade.

The goods traded are homogeneous: Some goods such as copper and wheat are almost identical and are bought on price. Manufactured goods are not identical. Goods are **branded** and consumers have preferences. Consumers do not only consider price. For example, they consider quality, packaging, image and so on. Consumer preferences can change comparative advantage.

No barriers to trade: For example if a **tariff** or **quota** is placed on imports the price consumers pay increases thereby reducing any comparative advantage.

Consumers and producers have perfect knowledge: Buyers and sellers do not have perfect knowledge. They do not always know where to buy goods at the lowest possible price.

Costs are constant: It is assumed that costs are constant. However, firms experience **increasing returns to scale** and **decreasing returns to scale** because of **economies of scale**. Economies of scale lead to increasing returns to scale and falling long-run average total costs, therefore any comparative advantage is increased. **Diseconomies of scale** lead to decreasing returns to scale and rising average costs, therefore any comparative advantage is reduced. When a country trades internationally it is producing for a very large market and is likely therefore to enjoy economies of scale that reduce costs and increase productive efficiency giving the country greater comparative advantage.

Factors are perfectly mobile: When calculating comparative advantage the assumption is made that all factors are employed. The production possibility curve shows all possible combinations of output of two goods when all factors are employed. In the real world there are always some factors that are unemployed because factors are not always mobile. For example, the UK lost its comparative advantage in ship building and the ship yards closed down; there were high levels of **structural unemployment** of labour and capital left unused. Workers and capital were unemployed. Specializing can be harmful if labour is not mobile. If workers cannot move to the industry in which the country is specializing, unemployment will increase.

There are only two economies: In the real world there are many countries all trading with each other. The assumption means that it is relatively easy to work out the comparative advantages and demonstrate the benefits of trade. However, it is possible to work out comparative advantage when studying lots of countries but the mathematical models required are much more difficult to create and understand.

Subject vocabulary

increasing returns to scale the situation in which increasing the inputs in production leads to a proportionally greater increase in output

decreasing returns to scale as the amount of all factors of production are increased, the resulting additional output falls

economies of scale the cost advantages gained by a firm from increasing the scale of its production. Average cost falls in the long run as the size of a firm's operation increases.

diseconomies of scale the cost disadvantages experienced by a firm when increasing the scale of its production. Average costs rise in the long run as the size of a firm's operation increases beyond a certain point.

structural unemployment unemployment caused by a change in the type of labour firms demand. It is caused by a mismatch of the skills of those unemployed and the skills needed by firms.

Test your understanding of this unit by answering the following questions

- Explain the sources of absolute and comparative advantage.
- Explain why the assumptions of comparative advantage limit the usefulness of the theory of comparative advantage.
- Using a fixed quantity of resources, country X and country Y can produce the quantities of wine and cheese shown in the table.

	Units of Wine	Units of Cheese
Country X	60	15
Country Y	90	30

1. Draw the PPC diagrams for country X and country Y.
2. Calculate the opportunity cost of wine and cheese in country X.
3. Calculate the opportunity cost of wine and cheese in country Y.
4. State which country has the comparative advantage in the production of wine.
5. State which country has the comparative advantage in the production of cheese.
6. Explain how both countries can benefit from specializing and then trading.
7. Show on the PPC diagrams how both countries can increase consumption.

Synonyms

imposing..... introducing

Learning Outcomes

- Explain, using a tariff diagram, the effects of **imposing** a tariff on imported goods on different stakeholders, including domestic producers, foreign producers, consumers, and the government.
- Explain, using a diagram, the effects of setting a quota on foreign producers on different stakeholders, including domestic producers, foreign producers, consumers, and the government.
- Explain, using a diagram, the effects of giving a subsidy to domestic producers on different stakeholders, including domestic producers, foreign producers, consumers, and the government.
- Describe administrative barriers that may be used as a means of protection.
- Evaluate the effect of different types of trade protection.

Subject vocabulary

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

perfectly elastic supply at a particular price quantity supplied is infinite but falls to nothing as price changes. The absolute value of PES is equal to infinity.

costs of production the amount the firm pays for the factors of production used to produce goods or services

consumer surplus the difference between the price a consumer is willing and able to pay and the price the consumer actually pays

purchasing power a measure of how many goods and services a given amount of money can buy

Discuss the effects of a tariff

A tariff is a tax placed on imports. Figure 70.1 shows the effect of a tariff charged on imported corn.

The demand curve shows the quantity demanded of corn by domestic consumers at each price. It slopes downwards showing as price rises **quantity demanded** falls. The domestic supply curve shows quantity supplied of corn by the domestic industry at each price. It slopes upwards showing that as price increases **quantity supplied** increases. The domestic equilibrium price, where quantity demanded by domestic consumers is equal to the quantity supplied by domestic producers is P_e .

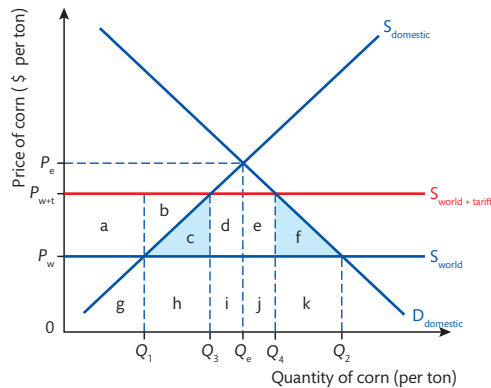


Figure 70.1

A tariff increases the price domestic consumers pay thereby reducing quantity demanded. Domestic producers do not pay the tariff so they keep all of the higher price. Because the price domestic producers receive increases they are willing to increase quantity supplied. Foreign producers do not receive the higher price because the tariff that consumers pay goes to the government not the foreign producers. They receive the same price as they did before the tariff.

After the tariff the price consumers pay increases and the quantity demanded falls. Domestic producers increase quantity supplied in response to the higher price. Domestic producers now supply a greater quantity than before the tariff and because quantity demanded has decreased the quantity supplied by foreign producers falls.

Model sentence: A tariff increases the price consumers pay leading to a fall in **consumer surplus** and a fall in the **purchasing power** of their income.

Describe the market for corn before the tariff

The world price of corn is P_w . At P_w the quantity of corn demanded by domestic consumers is Q_2 tons of corn. At P_w domestic producers are willing to supply Q_1 tons of corn. The rest of the corn, $Q_2 - Q_1$, is supplied by foreign producers.

Producer revenue = price \times quantity sold. Domestic producer revenue = $P_w \times Q_1$ represented by the area marked g.

Foreign producer revenue = $P_w \times (Q_2 - Q_1)$ represented by the area h + i + j + k.

Describe the market for corn after the tariff

The tariff increases the world price of corn from P_w to P_{w+t} . The supply curve S_{world} shifts up to $S_{world + tariff}$. At P_{w+t} the quantity of corn demanded by domestic consumers falls from Q_2 to Q_4 tons of corn. At the higher price P_{w+t} domestic producers are willing to increase quantity supplied from Q_1 to Q_3 tons of corn. The rest of the corn, $Q_4 - Q_3$, is imported. The quantity of corn imported falls from $Q_2 - Q_1$ to $Q_4 - Q_3$.

Domestic producer revenue increases from $P_w \times Q_1$ to $P_{w+t} \times Q_3$. The area representing domestic producer revenue increases from g to g + a + b + c + h.

Foreign producers receive $P_{w+t} \times (Q_4 - Q_3)$ represented by the area i + d + e + j. However, the tariff on the sale of the imported corn must be paid to the government. The government tax revenue = $(P_{w+t} - P_w) \times (Q_4 - Q_3)$ represented by the area d + e. The rest of the revenue from the sale of the imported corn goes to the foreign producers. Foreign producer revenue is represented by the area i + j. Foreign producer revenue falls from area h + i + j + k to area i + j.

Discuss the effects on welfare of a tariff

The tariff leads to an increase in the quantity supplied of corn by domestic producers from Q_1 to Q_3 . The minimum revenue domestic producers are willing to take to supply Q_1 to Q_3 of corn is represented by the area $h + c$, the area under the domestic supply curve and between Q_1 and Q_3 . Before the tariff foreign suppliers were willing to supply Q_1 to Q_3 of corn for less revenue represented by area h , the area under the world supply curve and between Q_1 and Q_3 . Before the tariff Q_1 to Q_3 of corn was supplied by the more efficient foreign producers of corn. They were willing to supply Q_1 to Q_3 of corn at P_w because their average total cost is low enough to make a profit on each unit sold at that price. Area c is the difference between the minimum revenue needed by domestic producers and the minimum needed by foreign producers.

The less efficient domestic producers use more of the world's scarce resources to produce Q_1 to Q_3 of corn than those used by the more productive foreign producers. Therefore fewer of the world's scarce resources could be used to produce corn. If domestic producers used their resources to produce goods that they are most efficient at producing then total output from a limited quantity of resources could be increased. Area c represents a loss of world efficiency caused by a tariff.

Before the tariff, consumer expenditure on $Q_2 - Q_4$ of corn at P_w was represented by the area k ($P_w \times (Q_2 - Q_4)$). Total consumer surplus was represented by the area above P_w and below the demand curve. The tariff leads to a fall in quantity demanded of corn by domestic consumers from Q_2 to Q_4 as the price of corn increases from P_w to P_{w+t} . $Q_2 - Q_4$ of corn is now not bought nor is it consumed. Therefore consumer expenditure falls. After the tariff there is a fall in consumer expenditure represented by the area k . Consumers no longer spend this amount. Area f represents the loss of consumer surplus that consumers used to receive on the consumption of $Q_2 - Q_4$ of corn when price was at P_w . The loss of consumer surplus, a **welfare loss**, is caused by the tariff.

Area c and area f in Figure 70.1 represent the welfare loss to society from the imposition of the tariff.

Model sentence: A tariff increases government tax revenue. Government can use this revenue to increase expenditure on public goods, quasi-public goods and merit goods increasing production and consumption of them and thereby correcting market failure.

Model sentence: A tariff increases the quantity supplied by domestic producers thereby protecting domestic jobs. This reduces the private costs and external costs of unemployment.

The government spends less on unemployment benefits and receives more **income tax** revenue thereby reducing the **budget deficit** or increasing the **budget surplus**.

What are the effects of a tariff on costs of production, price of consumer goods, and international competitiveness?

Corn is used by firms in the production of other goods for example in animal feed and in the production of ethanol. An increase in the price of corn increases costs of production leading to **cost-push inflation**. Firms pass on the higher cost to the consumer to pay in the form of higher prices. Corn is used to feed chickens, therefore the tariff on corn leads to an increase in the price of chicken meat and other meat products. The increase in price reduces consumer surplus and reduces the purchasing power of income leading to a fall in **consumer welfare**. Higher prices lead to a fall in international competitiveness and a fall in quantity of exports demanded, causing unemployment in exporting industries.

Subject vocabulary

welfare loss the sum of the loss of consumer and producer surplus caused by market or government failure

quasi-public goods goods that share some of the characteristics of public goods but are not fully non-excludable and non-rival. A road is an example. Most roads are free at the point of use but it is possible to make people pay through tolls and when traffic is heavy the amount available to others to use does begin to diminish so there can be rivalry in consumption.

merit good a good/service that the government believes will be under consumed left to the free market. Consumption of a merit good may generate positive externalities therefore the social benefit of consumption is greater than the private benefit.

private costs the cost incurred by firms or consumers from their own production or consumption of a good

external cost occurs when the production or consumption of a good creates a cost that must be paid by third parties

income tax a direct tax on individual earnings (wages, rent, profit, interest) and paid to the government

budget deficit occurs when government expenditure is greater than tax revenue

budget surplus when tax revenue exceeds government expenditure

cost-push inflation inflation caused by an increase in the costs of production, resulting in a decrease in aggregate supply

consumer welfare a measure of the benefit obtained from the consumption of goods

Discuss the effects of a quota

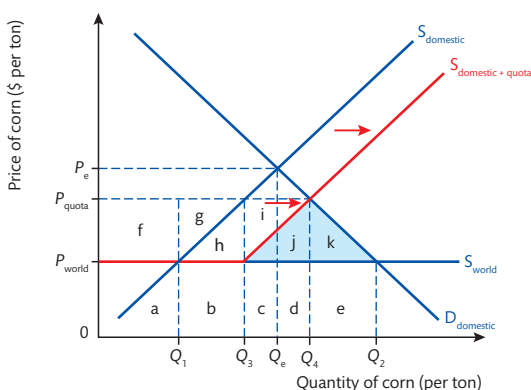


Figure 70.2

A quota is a physical limit on the quantity of an imported good. The quantity of an imported good allowed to enter a country is set by the government. The effects of a quota are shown in Figure 70.2.

Describe the market for corn before the quota

Before the quota the price per ton of corn is P_{world} . The world supply curve is perfectly elastic with respect to price. Foreign producers are willing to supply any quantity of corn at P_{world} . At P_{world} domestic producers are willing to supply Q_1 of corn. Their revenue is represented by the area a. Domestic demand at P_{world} is Q_2 of which Q_1 is supplied by domestic producers and the rest, $Q_2 - Q_1$ of corn is imported. The foreign producer's revenue is represented by the area b + c + d + e.

Describe the market for corn after the quota

The government sets a quota of $Q_3 - Q_1$. The quantity of corn imported falls from $Q_2 - Q_1$ to $Q_3 - Q_1$. Domestic producers continue to supply Q_1 of corn because the price has not changed. Total quantity supplied falls from Q_2 to Q_3 . The quantity of corn demanded stays at Q_2 because the price has not changed.

After the quota at the price P_{world} quantity demanded is greater than quantity supplied. There is **excess demand** of $Q_2 - Q_3$ at the world price. In order to remove the excess demand the price rises. As price rises foreign producers would like to supply more corn but are not able to because they are already supplying $Q_3 - Q_1$ which is the physical limit allowed. Domestic suppliers, however, increase quantity supplied in response to the higher price.

Ceteris paribus, as price increases profit in the industry increases. The higher profit available to producers of corn attracts new firms into the industry. The number of firms in an industry is a **determinant of supply**. There are now more farmers producing corn; therefore, the supply of corn increases at each price and the domestic supply curve shifts down and to the right from S_{domestic} to $S_{\text{domestic} + \text{quota}}$.

As price increases quantity demanded falls. The equilibrium price with a quota depends, in part, on the size of the shift of the domestic supply curve. In Figure 70.2 (on page 203) the equilibrium price with a quota is P_{quota} and the equilibrium quantity is Q_4 .

At the price P_{quota} domestic producers supply $Q_1 + (Q_4 - Q_3)$ of corn. Their revenue increases from area a to area a + c + d + f + i + j.

Foreign producers supply $Q_3 - Q_1$. Their revenue changes from b + c + d + e to area b + g + h. It is possible for their revenue to rise or fall. This depends, in part, on the size of the quota and the size of the shift of the domestic supply curve.

Discuss the effects on welfare of a quota

After the quota domestic producers supply an additional quantity of corn, $Q_4 - Q_3$. In order to supply this quantity they need a minimum revenue represented by the area c + d + j. This is the area below the supply curve, $S_{\text{domestic} + \text{quota}}$ and between Q_3 and Q_4 . The foreign producers are more efficient and produce each unit at a lower average total cost. Therefore, they needed less revenue to produce $Q_4 - Q_3$ of corn. They were willing to supply this quantity for the revenue represented by the area c + d. This is the area below the supply curve, S_{world} and between Q_3 and Q_4 . Area j is the difference between the minimum revenue needed by domestic producers and the minimum needed by foreign producers.

After the quota more of the world's scarce resources are used to produce corn because the foreign producers are more efficient and are able to produce $Q_4 - Q_3$ of corn using fewer resources. A quota leads to a less efficient outcome and a **welfare loss** represented by the area j.

Before the quota the quantity demanded was Q_2 . Total **consumer surplus** was represented by the area above P_w and below the demand curve. After the quota the price increased from P_w to P_{quota} leading to a fall in quantity demanded from Q_2 to Q_4 . Consumer expenditure on $Q_2 - Q_4$ of corn was represented by the area e. After the quota consumers do not buy this quantity of corn. Area k represents the consumer surplus that consumers used to receive on the consumption of $Q_2 - Q_4$ of corn at the world price P_w . The loss of consumer surplus is a welfare loss caused by the introduction of a quota.

Using a tariff to protect domestic industry and domestic jobs does increase government tax revenue. Using a quota to reduce the quantity of imported goods does not directly increase tax revenue. However, the possible increase in revenue and profits of the domestic producers might lead to an increase in the amount of tax raised on company profits.

Discuss the effects of a subsidy

A subsidy per unit is a payment made by the government to domestic producers on each unit of output. In effect a subsidy reduces the domestic producers' costs of production, therefore the producers are willing to supply more at each price and the domestic supply curve shifts down and to the right as shown in Figure 70.3.

Subject vocabulary

excess demand occurs when quantity demanded is greater than quantity supplied

ceteris paribus latin phrase meaning 'all other things being equal' or 'all other things being held constant'

determinants of supply factors that affect quantity supplied at each price

welfare loss the sum of the loss of consumer and producer surplus caused by market or government failure

consumer surplus the difference between the price a consumer is willing and able to pay and the price the consumer actually pays

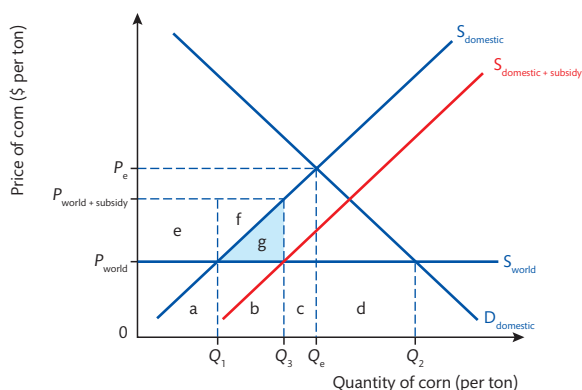


Figure 70.3

Describe the market for corn before the subsidy

Before the subsidy, at the world price P_{world} , the quantity demanded by domestic consumers was Q_2 . At P_{world} domestic producers supply Q_1 . The amount of revenue they received is $P_{\text{world}} \times Q_1$ represented by the area a . $Q_2 - Q_1$ was supplied by foreign producers. The amount of revenue they received is represented by the area $b + c + d$.

Describe the market for corn after the subsidy

The subsidy per unit causes the domestic supply curve to shift down and to the right from S_{domestic} to $S_{\text{domestic} + \text{subsidy}}$. The vertical distance between the supply curves is equal to the subsidy per unit.

The price consumers pay does not change because the price is determined on the world market which is not affected by the subsidy. Domestic consumers therefore continue to demand the same quantity of corn, Q_2 .

After the subsidy domestic producers are willing to increase supply because they now receive the world price plus the subsidy per unit. At $P_{\text{world} + \text{subsidy}}$ domestic supply increases from Q_1 to Q_3 . The revenue they receive increases from the amount represented by area a to the amount represented by area $a + b + e + f + g$.

Area $a + b$ is revenue domestic producers receive from the consumers and area $e + f + g$ is the total subsidy paid by the government to the producers.

After the subsidy the quantity of corn supplied by foreign producers falls from $Q_2 - Q_1$ to $Q_2 - Q_3$. The revenue they receive falls from the amount represented by area $b + c + d$ to the amount represented by area $c + d$.

Discuss the effects on welfare of a subsidy

After the subsidy domestic producers supply an additional quantity of corn, $Q_3 - Q_1$. The minimum amount of revenue they need to supply this additional quantity is represented by the area $b + g$. This is the area below the original supply curve S_{domestic} and between Q_1 and Q_3 . The foreign producers are more efficient and produce each unit at lower average total cost. Therefore they would be willing to supply this quantity for less revenue. The amount of revenue they would need is represented by area b . This is the area below the supply curve, S_{world} and between Q_1 and Q_3 . Area g is the difference between the minimum revenue needed by domestic producers and the minimum needed by foreign producers.

After the subsidy more of the world's scarce resources are used to produce corn because the foreign producers are more efficient and are able to supply $Q_3 - Q_1$ of corn using fewer resources than the domestic producers. A subsidy leads to a less efficient outcome and loss of welfare represented by the area g .

The price paid by the consumer is not affected by the subsidy. Consumer surplus represented by the area above the world price and below the demand curve is not changed by the subsidy. Therefore a subsidy does not cause a loss of consumer surplus. Consumer expenditure on Q_2 of corn is represented by the area $a + b + c + d$ before and after the subsidy. Consumers continue to spend the same amount. However, government expenditure increases by the amount of the subsidy represented by the area $e + f + g$. Therefore the government might have to increase taxes in order to pay the subsidy, which would reduce households' disposable income and consumer expenditure.

Model sentence: There is also an **opportunity cost** of a subsidy. The tax revenue spent on the subsidy cannot be spent on **public goods** and **merit goods**.

Subject vocabulary

opportunity cost the next best alternative forgone

public goods a good that is non-excludable and non-rivalrous. Once provided it is not possible to stop people benefitting from the consumption of it and therefore people free ride – they do not pay. The good will not be supplied left to the free market because no firm would be able to make a profit. Also, consumption of the good by one person does not diminish the amount available for others to consume.

merit goods goods that the government believes will be under consumed left to the free market. Consumption of a merit good may generate positive externalities therefore the social benefit of consumption is greater than the private benefit.

Subject vocabulary

tariff a tax placed on imported goods and services

quotas a physical limit placed on the number of goods that can be traded or produced

Glossary

customs the place at a port, airport, or frontier where officials check incoming goods, travellers, or luggage

licence a permit from an authority to own or use something, do a particular thing, or carry on a trade

corruption illegal/immoral behaviour particularly by person(s) in power

Subject vocabulary

multinational corporations a corporation that operates in two or more countries

economies of scale the fall in average cost in the long run brought about by an increase in the size of a firm's operation

Explain how administrative barriers can be used to protect domestic producers

Model sentence: As more countries sign free trade agreements and remove **tariffs** and **quotas**, governments look for other ways to protect domestic producers including administrative barriers.

Some countries increase the amount of paperwork that it is necessary to complete before imported goods can enter a country. Imported goods must go through **customs** before entering a country. Lots of time is taken to check the goods and the necessary documents at the port. The people who do these jobs can do them very slowly if told to by the government. The procedures that exporters must follow are often unclear and the exporting firms must correctly fill in a very large quantity of documents. All this increases firms' costs of production leading to a fall in competitiveness and some firms give up trying to export their goods into that country.

Some countries put up barriers by making health and safety standards, environmental standards, and quality standards very difficult to meet. For example, drug companies exporting drugs find it more difficult to get the necessary **licence** from the importing country thereby protecting domestic drug producers from foreign competition.

Technical standards can be set that require the exporting firms to carry out long and difficult tests to show that the very high, and at times unreasonable, standards have been met. For example, there are technical standards that must be met on food, and the safety of toys and cars. Some goods must be a particular size or shape, and be packaged and labelled in a certain way. Goods are tested and checked to make sure they meet the required standards.

Model sentence: Meeting the technical standards of the importing country increases the firm's costs of production reducing its competitiveness, and thereby protecting the less efficient domestic firms from foreign competitors.

Test your understanding of this unit by answering the following questions

- Using a diagram, explain the effects of a tariff on producer and consumer revenue.
- Explain why a tariff reduces consumer surplus.
- Using a diagram, explain the effect of a subsidy per unit on the quantity of imports.
- Using a diagram, explain how a quota affects the use of the world's scarce resources.

Learning Outcomes

- Discuss the arguments in favour of trade protection, including the protection of domestic jobs, national security, protection of infant industries, the maintenance of health, safety and environmental standards, anti-dumping and unfair competition, a means of overcoming a balance of payments deficit and a source of government revenue.
- Discuss the arguments against trade protection, including a misallocation of resources, the danger of retaliation and "trade wars", the potential for **corruption**, increased costs of production due to lack of competition, higher prices for domestic consumers, increased costs of imported factors of production, and reduced export competitiveness.

Subject vocabulary

infant industry a new industry which often is not able to compete against established foreign industries and therefore needs to be protected from the competition through subsidies and tariffs

Discuss the arguments for and against protectionism

Discussed below are some of the advantages and disadvantages of protectionism.

Discuss the use of trade barriers to protect infant industries

Large **multinational corporations** produce goods on a very large scale and therefore benefit from **economies of scale**. The firms are able to produce output at relatively low average total cost. An **infant industry** that starts up in a country has a much smaller market and therefore produces fewer goods. It does not benefit from the economies of scale available to the much larger foreign producers. The average costs are therefore higher. The infant industry is unable to compete at the price set by the foreign producers. The new infant industry's average cost is likely to be higher than the price charged by the foreign producers, therefore the infant industry is unable to make a profit at that price.

Restricting the number of imports, for example by a tariff, increases the price of the good and allows the infant industry to compete even though its average cost is higher than the foreign competition. Protected from the more efficient competition the infant industry has time to develop a skilled workforce and efficient methods of production and to build up market share. As output increases the infant industry can benefit from economies of scale. When its average costs have fallen enough, the tariff can be removed.

However, an infant industry that is protected from competition can become **productively inefficient**. It can stay in business even when producing goods at a relatively high average cost. Governments come under pressure from the industry to continue protecting it. In response foreign governments might protect their own industries which reduces the quantity of goods the infant industry exports, thereby limiting its growth.

Discuss the use of trade barriers to protect domestic jobs

Protectionist policies can protect domestic jobs. For example a US tariff on imported steel raises its price thereby increasing the sale of US steel to domestic buyers. Without protection there would be less domestic consumption of US steel and fewer steelworkers employed. A tariff might reduce the budget deficit as expenditure on unemployment benefits falls and tax revenue rises.

Steel is used by US firms in the production of lots of goods such as cars, trains, washing machines, fridges, and paperclips. After a tariff is introduced US firms have to pay a higher price for steel thereby increasing their **costs of production**. Firms put up prices to maintain their **profit margins** making them less competitive. **Quantity demanded** falls and firms reduce the number of workers they employ. Therefore protectionist policies might protect jobs in the protected industry but lead to higher prices and an increase in unemployment in other industries. In effect protectionist policies transfer resources away from domestic consumers to the protected industry.

The protection of industries leads to **cost-push inflation** as firms increase prices in response to higher costs of production. This reduces consumers' **real income** leading to a fall in **aggregate demand** and a rise in unemployment.

If the US government puts a tariff on imported goods, foreign governments may respond by placing a tariff on imports from the US leading to a fall in quantity demanded of US exports and a rise in unemployment in **exporting industries**.

Protectionist policies lead to a change in production away from countries producing at relatively low average total cost to countries producing at relatively high average total cost. More of the world's scarce resources are used to produce the goods than is necessary leading to a loss of social welfare.

Model sentence: Protectionism leads to a loss of the gains from international trade that come from the **comparative advantage** each country has in the production of particular goods.

Discuss the use of trade barriers to protect industries from cheap imports from low labour cost countries

Some countries have relatively low labour costs. Therefore their costs of production are lower and they are able to sell their goods in foreign markets at a lower price than domestic firms that have higher labour costs. To protect the industries from cheaper imports a country can put up **barriers to trade**. Some countries have a comparative advantage in the production of some goods because of their low labour costs. Domestic industries and jobs are protected by the barriers to trade but the less efficient firms continue to use resources to produce the goods when these goods could be produced by foreign firms using less of the world's scarce resources. Therefore there is a **misallocation of resources**. Domestic firms should use the resources to produce goods for which they have a comparative advantage in producing. In this way the world's scarce resources can be used to produce more output.

Model sentence: Free trade allows consumers to buy goods at a lower price increasing consumer surplus and increasing **real income**. As real income rises aggregate demand increases leading to a fall in unemployment.

Discuss the use of trade barriers to prevent dumping

Dumping occurs when goods are exported to a country and sold at a price that is below average total cost. Therefore each good is sold at a loss. Firms dump their goods into foreign markets for a number of reasons. Firms with **excess supply** that they are unable to sell can 'dump' the goods in order to earn at least some **producer revenue**. If the price the firm receives for the good is above its **average variable cost** the firm can use this revenue to pay some of its fixed costs.

Subject vocabulary

productively inefficient describes a firm that is not producing goods at the lowest average cost

costs of production the amount the firm pays for the factors of production used to produce goods or services

profit margin the percentage of producer revenue that ends up as profit for the firm. Profit margin = profit/producer revenue × 100. If a firm earns a profit of \$20m from sales of \$80m its profit margin is 25%.

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

cost-push inflation inflation caused by an increase in the costs of production, resulting in a decrease in aggregate supply

real income income after taking into account the effects of inflation on purchasing power

aggregate demand the total demand for goods and services in the economy at a given price level in a given period of time

exporting industries industries that produce output in one country and sell at least some of the output to buyers in other countries

comparative advantage when a country, firm, or individual is able to produce a particular good or service at a lower opportunity cost than other countries, firms, or individuals

barriers to trade restrictions imposed by a government on the free exchange of goods or services between countries

misallocation of resources occurs when the allocation of resources leads to welfare loss and therefore a reallocation of resources could increase society's welfare

real income income after taking into account the effects of inflation on purchasing power

excess supply occurs when quantity supplied is greater than quantity demanded

producer revenue the income a firm receives from consumers in exchange for goods (revenue = price × quantity sold)

average variable cost equal to total variable cost divided by quantity of output

Subject vocabulary

profit the difference between total revenue (price \times quantity sold) and economic costs (explicit costs + implicit costs)

consumer surplus the difference between the price a consumer is willing and able to pay and the price the consumer actually pays

real income income after taking into account the effects of inflation on purchasing power

private costs of consumption the cost incurred by consumers from their own consumption of a good

comparative advantage when a country, firm, or individual is able to produce a particular good or service at a lower opportunity cost than other countries, firms, or individuals

welfare loss the sum of the loss of consumer and producer surplus caused by market or government failure

supply-side policies government policy designed to affect the level of aggregate supply in an economy by increasing the quantity and/or productivity of the factors of production

productivity the quantity of output per unit of input

tariffs a tax placed on imported goods and services

black market an illegal market in goods or services

GDP gross domestic product is the monetary value of all the finished goods and services produced within a country in a given period of time, usually measured over a year

protectionism government policies, including tariffs, quotas, and subsidies, that restrict the extent of international trade and which are implemented in order to protect domestic industries from cheaper imports

Model sentence: A foreign firm can drive domestic firms out of business by dumping. The domestic firms are unable to compete at the low price and they leave the industry. The foreign firm can then increase its price and earn higher profits.

Protectionist policies can be used to increase the price of the imports thereby protecting domestic firms and jobs from dumping. Domestic firms continue to make **profit** and workers continue to earn a wage. The government receives tax revenue from income earned and pays out less in unemployment benefits. However, domestic consumers can benefit from dumping because they are able to buy goods at lower prices leading to an increase in **consumer surplus** and a rise in **real income**.

Discuss the use of trade barriers to protect standards

Countries have legal health and safety and environmental standards that goods must meet. If this is done to protect consumers from **private costs of consumption** then such standards are valid. Imported goods must also meet the standards set by the government. Increasingly countries are using the standards to stop the importing of goods that the government says will cause harm to the consumers. Domestic firms are protected from foreign competition. For example, some US beef producers inject cattle with hormones. Some countries have banned the importing of beef from the US because of the possible harmful effect on health. However, the evidence that the beef causes harm has not been proven. The US government believes that foreign countries have used the health and safety standards not to protect the health of its domestic consumers but to protect domestic producers.

Foreign producers must meet the standards set and this increases their costs of production. The **comparative advantage** in the production of these goods is lost and the less efficient domestic producers are protected from the more efficient foreign producers leading to a **welfare loss**.

Discuss the use of trade barriers to reduce a current account deficit and as a source of government revenue

A country has a current account deficit when expenditure on its imports by domestic consumers is greater than the expenditure on its exports by foreign consumers. The country spends more income on imports than it earns on exports. Protectionist policies reduce the demand for imports and increase demand for domestically produced goods thereby income spent on imports falls. As expenditure on imports falls the current account deficit falls. However, it is likely that foreign countries will put up barriers to trade in response. Therefore demand for exports falls leading to a fall in expenditure on exports. The fall in the current account deficit from a reduction in expenditure on imports is reversed by a fall in expenditure on exports. Therefore the use of trade barriers to reduce the current account deficit does not work. Instead the government should consider the introduction of **supply-side policies** that will improve the **productivity** of domestic industry thereby helping domestic industry to compete against more efficient foreign firms. In this way domestic firms become more competitive and some consumers will switch expenditure away from foreign firms to domestic firms, thereby reducing the current account deficit.

Tax revenue from **tariffs** is an important source of tax revenue for a government. In some countries the **black market** makes up a relatively high proportion of **GDP**; therefore, tax is avoided and tax revenue is relatively low. The tax raised on imported goods is very important to the governments of such countries.

What are the main arguments against trade protectionism?

Many of the arguments against **protectionism** have been discussed above. These arguments are summarized below.

It is likely that when a country seeks an advantage by raising barriers to trade against other countries these countries will respond by raising barriers to trade against that country. A trade war occurs between countries when each country keeps responding to the action of the other. In this way barriers continue to rise. A trade war is a possible outcome of protectionist policy and everyone loses out as explained below.

Barriers to trade lead to a loss of welfare. When barriers to trade are raised, consumers switch expenditure away from foreign firms that produce goods at relatively low average total cost to domestic firms producing at relatively high average total cost. There is a misallocation of resources because more of the resources are used to produce goods than is necessary.

Model sentence: When barriers to trade are raised, the potential gains from trade brought about by the comparative advantage countries have in the production of goods are lost. Fewer goods are produced with a given quantity of resources.

Domestic firms become productively inefficient when protected from foreign competition leading to higher costs of production. The domestic firms are able to charge a higher price and earn higher profits.

Without access to cheaper imported goods, the price the consumers pay increases. Real incomes fall leading to a fall in **aggregate demand**.

Model sentence: When barriers to trade are raised, consumers pay a higher price for goods leading to a loss of consumer surplus and a fall in real incomes.

Barriers to trade on resources used in the production of other goods increase the price domestic firms pay for the resources, thereby increasing their costs of production. Firms put up the price of their goods in order to maintain **profit margins**. This leads to a fall in the quantity demanded by foreign consumers of the final goods. The expenditure spent on exports falls leading to an increase in the current account deficit.

Test your understanding of this unit by answering the following questions

- Outline the benefits of protectionism.
- Does the use of a tariff protect domestic jobs?
- Explain why consumers might not benefit from protectionism.
- Discuss the effects on welfare of protectionist policies.

Subject vocabulary

aggregate demand the total demand for goods and services in the economy at a given price level in a given period of time

profit margins the percentage of producer revenue that ends up as profit for the firm. Profit margin = profit/producer revenue $\times 100$. If a firm earns a profit of \$20m from sales of \$80m its profit margin is 25%.

Learning Outcomes

- Calculate from diagrams the effects of imposing a tariff on imported goods on different stakeholders, including domestic producers, foreign producers, consumers, and the government. (HL)
- Calculate from diagrams the effects of setting a quota on foreign producers on different stakeholders, including domestic producers, foreign producers, consumers, and the government. (HL)
- Calculate from diagrams the effects of giving a subsidy to domestic producers on different stakeholders, including domestic producers, foreign producers, consumers, and the government. (HL)

Calculate the effects of a tariff on foreign and domestic producers, consumers, and the government using the information in Figure 72.1 (HL)

A tariff is a tax placed on imported goods by the government which increases the price of the good. The quantity of steel demanded at each price is shown by the **demand curve** D_{domestic} . It slopes downwards showing that as price rises **quantity demanded** falls. The **quantity supplied** at each price by domestic producers is shown by the

supply curve S_{domestic} . The domestic supply curve slopes upwards showing that as price increases the quantity of steel domestic producers supply increases. The quantity supplied by foreign producers is shown by the supply curve S_{world} . World supply is **perfectly elastic** with respect to price. This means that foreign producers are willing to supply any quantity of steel at the world price.

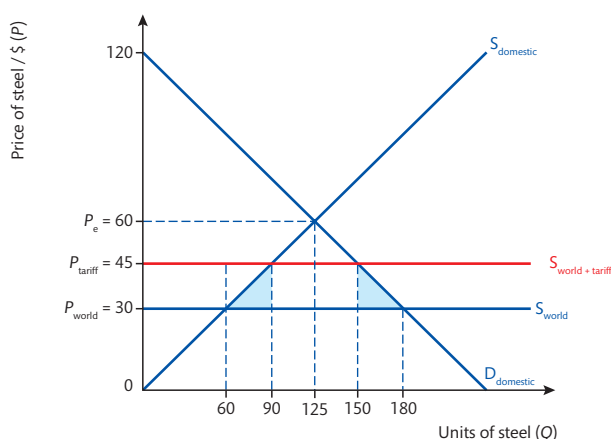


Figure 72.1

Subject vocabulary

demand curve a graph that shows the relationship between price and quantity demanded

quantity demanded the amount of a good consumers are willing and able to buy at a given price over a given period of time

quantity supplied the amount of a good that firms are willing and able to produce at a given price over a given period of time

supply curve a graph that shows the relationship between price and quantity supplied

perfectly elastic at a particular price quantity supplied is infinite but falls to nothing as price changes. The absolute value of PES is equal to infinity.

Calculate the foreign producer revenue, domestic producer revenue, and government revenue before the tariff – a step-by-step guide

Trouble shooter

Price = $P_{\text{world}} = \$30$ per unit. Quantity demanded by domestic consumers at \$30 per unit = 180 units.

Foreign producers are willing to supply an unlimited amount at \$30 but there is only demand for 180 units.

Quantity supplied by domestic producers at \$30 per unit = 60 units

Quantity supplied by foreign producers = $180 - 60 = 120$ units

Domestic producer revenue = $P_{\text{world}} \times \text{Quantity} = \$30 \times 60 = \$1800$

Foreign Producer revenue = $P_{\text{world}} \times \text{Quantity} = \$30 \times 120 = \$3600$

Government revenue = tariff per unit \times the quantity of imports = $\$0 \times 120 = 0$

Calculate the foreign producer revenue, domestic producer revenue, and government revenue after the tariff – a step-by-step guide

Trouble shooter

A tariff is a tax placed on imported goods by the government, which increases the price of the good by the amount of the tariff.

World price before tariff = \$30. World price after the tariff = \$45. Tariff = $\$45 - \$30 = \$15$.

Quantity demanded by domestic consumers at \$45 per unit = 150 units

Foreign producers are willing to supply an unlimited amount at \$45 but there is only demand for 150 units.

Quantity supplied by domestic producers at \$45 per unit = 90 units

Quantity supplied by foreign producers = $150 - 90 = 60$ units

Domestic producer revenue = $P_{\text{tariff}} \times \text{Quantity} = \$45 \times 90 = \$4050$

World price + tariff = $\$30 + \$15 = \$45$.

For each unit sold foreign producers get \$30 and the government gets \$15.

Foreign producer revenue = $P_{\text{world}} \times \text{Quantity} = \$30 \times 60 = \$1800$

Government revenue = tariff per unit \times the quantity of imports = $\$15 \times 60 = \900

Calculate the changes in foreign producer revenue, domestic producer revenue, and government revenue – a step-by-step guide

Trouble shooter

Foreign producer revenue after tariff = \$1800, and revenue before the tariff = \$3600

The change in foreign producer revenue = $\$1800 - \$3600 = -\$1800$

Foreign producer revenue falls by \$1800.

Domestic producer revenue after the tariff = \$4050, and revenue before the tariff = \$1800

The change in domestic producer revenue = $\$4050 - \$1800 = \$2250$

Domestic producer revenue increases by \$2250.

Government revenue after the tariff = \$900, and revenue before the tariff = \$0

Government tax revenue increases by \$900.

Calculate the loss of consumer surplus caused by the tariff – a step-by-step guide

Trouble shooter

Consumer surplus is the total difference between the price consumers are willing to pay and the price consumers actually pay. It is represented by the area above price and below the demand curve. The formula to calculate the area of a triangle is $\frac{1}{2} \times \text{base} \times \text{height}$.

Before the tariff the highest price the first consumer is willing to pay is \$120. The price actually paid is \$30.

The difference = $\$120 - \$30 = \$90$. The height of the triangle = 90.

The quantity bought and sold at \$30 per unit is 180 units. The base = 180.

Consumer surplus = $\frac{1}{2} (\text{base} \times \text{height}) = \frac{1}{2} (180 \times 90) = \frac{1}{2} \times 16\,200 = \8100 .

Before the tariff consumer surplus, the total difference between the amount consumers were willing to pay for the 180 units of steel and the total amount consumers actually paid is \$8100.

After the tariff the highest price the first consumer is willing to pay is \$120. The price actually paid is \$45.

The difference = $\$120 - \$45 = \$75$. The height of the triangle = 75.

The quantity bought and sold at \$45 per unit is 150 units. The base = 150.

Consumer surplus = $\frac{1}{2} (\text{base} \times \text{height}) = \frac{1}{2} (150 \times 75) = \frac{1}{2} \times 11\,250 = \5625 .

The loss of consumer surplus = $\$8100 - \$5625 = \$2475$

Calculate the net welfare loss caused by the tariff – a step-by-step guide

Trouble shooter

The two shaded triangles represent the net welfare loss.

The height of the triangle on the left = $45 - 30 = 15$. The base = $90 - 60 = 30$.

$\frac{1}{2} \text{ base} \times \text{height} = \frac{1}{2} (30 \times 15) = \frac{1}{2} \times \$450 = \$225$

The height of the triangle on the right = $45 - 30 = 15$. The base = $180 - 150 = 30$.

$\frac{1}{2} \text{ base} \times \text{height} = \frac{1}{2} (30 \times 15) = \frac{1}{2} \times \$450 = \$225$

Total net welfare loss = $\$225 + \$225 = \$450$

Calculate the effects of a quota on foreign and domestic producers, consumers, and the government using the information in Figure 72.2 (HL)

A quota is a physical limit put on the number of goods that can be imported. The government sets a quota of 30 units of steel as shown in Figure 72.2 (on page 212).

Calculate domestic and foreign producer revenue before the quota

Before the quota, world price is \$30 per unit and quantity demanded is 180 units of which 60 units ($60 - 0$) are supplied by domestic producers and 120 units ($180 \text{ units} - 60 \text{ units}$) are supplied by foreign producers.

Domestic producer revenue

(Price \times Quantity) = $\$30 \times 60 = \1800

Foreign producer revenue = $\$30 \times 120 = \3600

Calculate domestic and foreign producer revenue after the quota

The government sets a quota of 30 units. The quantity demanded stays at 180 units because price has not changed and domestic producers continue to supply 60 units ($60 - 0$). Foreign producers can only supply 30 units ($90 - 60$), therefore total quantity supplied = 90 units ($60 + 30$). There is an **excess demand** of 90 units ($180 - 90$).

Subject vocabulary

excess demand occurs when quantity demanded is greater than quantity supplied

Subject vocabulary

profit the difference between total revenue (price \times quantity sold) and economic costs (explicit costs + implicit costs)

market where buyers and sellers meet to exchange money for goods and services

industry a group of firms that produce the same or similar goods or services

determinant of supply factors that affect quantity supplied at each price

equilibrium price the price at which the quantity consumers are willing and able to buy is equal to the quantity firms are willing and able to produce

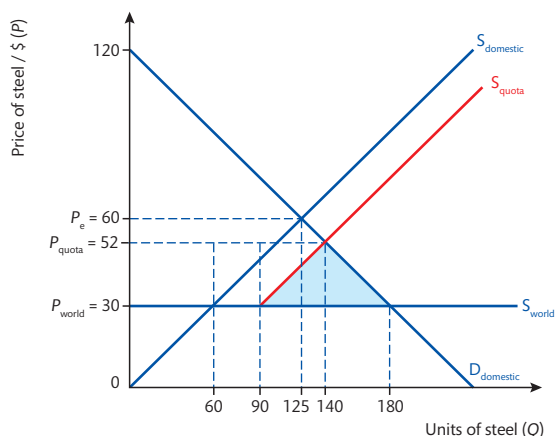


Figure 72.2

The **equilibrium price** rises from \$30 (P_{world}) to \$52 (P_{quota}). As price rises to \$52 quantity demanded falls from 180 units to 140 units. The foreign producers would like to increase the quantities supplied but cannot because they are not allowed to supply more than 30 units. At \$52 per unit of steel domestic producers increase quantity supplied from 60 units ($60 - 0$) to 110 units ($60 - 0 + 140 - 90$).

Price = \$52. Quantity demanded = 140 units. Total producer revenue = $\$52 \times 140 = \7280 . Domestic producer revenue after the quota = $\$52 \times 110 = \5720 an increase of \$3920 ($\$5720 - \1800). Foreign producer revenue after the quota = $\$52 \times 30 = \$1,560$ a fall of \$2040 ($\$1560 - \3600).

Calculate the loss of consumer surplus caused by the quota

Consumer surplus is the total difference between the price consumers are willing to pay and the price consumers actually pay. It is represented by the area above price and below the demand curve. The formula to calculate the area of a triangle is $\frac{1}{2} \times \text{base} \times \text{height}$.

Before the quota the highest price the first consumer is willing to pay is \$120. The price actually paid is \$30. The difference = $\$120 - \$30 = \$90$. The height of the triangle = 90. The quantity bought and sold at \$30 per unit is 180 units. The base = 180. Consumer surplus = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 180 \times 90 = \frac{1}{2} \times 16,200 = \8100 .

After the quota the highest price the first consumer is willing to pay is \$120. The price actually paid is \$52. The difference = $\$120 - \$52 = \$68$. The height of the triangle = 68. The quantity bought and sold at \$52 is 140 units. The base = 140. Consumer surplus = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 140 \times 68 = \frac{1}{2} \times 9520 = \4760 .

The loss of consumer surplus = $\$8100 - \$4760 = \$3340$

Calculate the net welfare loss caused by the quota

The shaded triangle represents the area of net welfare loss.

The height of the triangle = $\$52 - \$30 = \$22$. The base = $180 \text{ units} - 90 \text{ units} = 90$.

Net welfare loss of quota = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 90 \times 22 = \frac{1}{2} \times 1980 = \990 .

No government revenue is raised by a quota.

Calculate the effects of a subsidy on foreign and domestic producers, consumers, and the government using the information in Figure 72.3 (HL)

Calculate domestic and foreign producer revenue before the subsidy

Before the subsidy world price of steel is \$30 per unit and quantity demanded by domestic consumers is 180 units as shown in Figure 72.3. At \$30 domestic producers supply 60 units. Domestic producer revenue = $\$30 \times 60 = \1800 . Foreign producers supply 120 units ($180 - 60$). Foreign producer revenue = $\$30 \times 120 = \3600 .

Calculate domestic and foreign producer revenue after the subsidy

A subsidy per unit is a payment made by the government to domestic producers on each unit of output. In effect a subsidy reduces the domestic producers' costs of production so more profit is made at each price. The domestic producers are willing to supply more at each price and the domestic supply curve shifts down

To remove the excess demand, price rises and **profits** earned by domestic producers increase, attracting new firms into the **market**. The number of firms in an **industry** is a **determinant of supply**. There are now more domestic producers and the domestic supply curve shifts down and to the right from S_{domestic} to S_{quota} .

and to the right by the amount of the subsidy as shown in Figure 72.3. The vertical distance between the domestic supply curves is equal to the subsidy per unit. The subsidy in this example is \$15. The subsidy is paid to domestic producers by the government so the price consumers pay does not change, therefore quantity demanded stays at 180 units.

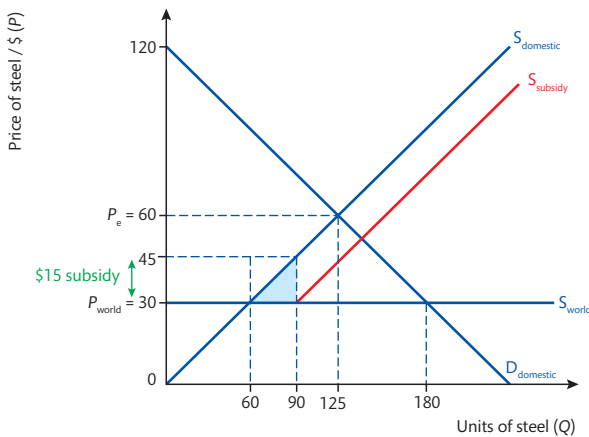


Figure 72.3

After the subsidy the quantity supplied by foreign producers falls from 120 units ($180 - 60$) to 90 units ($180 - 90$). The revenue they receive = $\$30 \times 90 = \2700 . Foreign producer revenue falls by \$900 ($\$2700 - \3600) after the subsidy.

Calculate the loss of consumer surplus caused by the subsidy

Consumer surplus is the total difference between the price consumers are willing to pay and the price consumers actually pay. It is represented by the area above price and below the demand curve. The formula to calculate the area of a triangle is $\frac{1}{2} \times \text{base} \times \text{height}$.

Before the subsidy the highest price the first consumer is willing to pay is \$120. The price actually paid is \$30.

The difference = $\$120 - \$30 = \$90$. The height of the triangle = 90.

The quantity bought and sold at \$30 per unit is 180 units. The base = 180.

Consumer surplus = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 180 \times 90 = \frac{1}{2} \times 16200 = \8100 .

The subsidy does not change the price consumers pay; therefore, the subsidy does not cause a loss of consumer surplus.

Calculate the net welfare loss caused by the quota

The shaded triangle represents the area of net welfare loss.

The height of the triangle = $\$45 - \$30 = 15$. The base = 90 units - 60 units = 30.

Net welfare loss of the subsidy = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 30 \times 15 = \frac{1}{2} \times 450 = \225 .

Calculate the government expenditure caused by the subsidy

Government expenditure = subsidy per unit \times quantity of domestic units = $\$15 \times 90 = \1350 .

Test your understanding of this unit by answering the following questions

- Draw a diagram showing the effects of a tariff from the following information:
 - When price is \$15 quantity demanded = 15 units, and quantity supplied = 45 units
 - When price is \$10 quantity demanded = 30 units, and quantity supplied = 30 units
 - When price is \$5 quantity demanded = 45 units, and quantity supplied = 15 units
 - The world price = \$5, and the tariff = \$3.
- Calculate producer and consumer revenue before and after the tariff, government revenue after the tariff and the level of welfare loss.